

DESCRIPTION

BINDING PIECE AND BINDING APPARATUS

5 Technical Field:

The present invention relates to a binding piece for binding a bag opening portion and a binding apparatus for binding the bag opening portion by the binding piece.

10 Background Art:

In bagging food for sale in a state of being dipped in water, food oozing out moisture or the like, a bag opening needs to be fastened such that moisture is not leaked. Although as a binding piece for such an object, in a conventional art, 15 generally a clip made of a metal of aluminum or the like has been used, there poses a problem that time and labor is taken for assorting a bag made of a resin of polyethylene or the like and the clip made of a metal at a stage of a waste abandoning processing. Further, when bound by the clip made of a metal, 20 there is also brought about a drawback that it cannot be inspected by a metal detector whether a foreign matter of a metal is mixed to inside of the bag containing food or the like.

As a constitution for resolving the above-described problem, there is a two-pieces-type binding piece made of plastic 25 (JP-A-2004-026289). The binding piece comprises a U-type clip

and a receiving member fitted thereto, the receiving member is formed with two holes in correspondence with a pair of leg portions of the clip and there is established a relationship of tightening fit in which an inner diameter of the hole of 5 the receiving member is slightly smaller than a diameter of the leg portion of the clip such that coupling of the clip and the receiving member is not loosened or detached.

Fitting of the clip and the receiving member is carried out by an exclusive binding apparatus, a driver of the binding 10 apparatus extrudes the clip to a closed bag opening, the pair of leg portions of the clip are made to lay at the bag opening, the leg portion of the clip is press-fitted to the hole of the receiving member set to a holding portion of the binding apparatus, and the bag opening is fastened by the clip and 15 the receiving member.

Further, the binding apparatus is charged with a clip connecting body mounted with a plurality of the clips and a receiving member connecting body connected with a plurality of the receiving members, the clip at a front head of the clip 20 connecting body is cut to be separated, the receiving member at a front head of the receiving member connecting body is cut to be separated, and the bag opening portion is bound by press-fitting the pair of leg portions of the clip to the pair of holes of the receiving member.

In this way, according to the binding apparatus of the background art, two connecting bodies of the clip connecting body and the receiving member connecting body need to be charged respectively separately from each other, also two of feeding 5 mechanisms for feeding the clip connecting body and the receiving member connecting body need to be provided and therefore, the binding apparatus is constituted by a complicated structure.

Further, a problem that the two connecting bodies need to be controlled is posed.

10 Further, different from binding means for binding the bag opening by folding to bend the leg portion of the clip made of a metal, a two-pieces-type binding piece comprising a clip made of plastic and a receiving member applies a pressure to the clip and the receiving member to be fitted to each other, 15 the clip and the receiving member are brought into a relationship of tight fitting, and in press-fitting, a resisting force (= friction coefficient \times load per unit area \times area) is operated.

20 The friction coefficient is changed by a surface state, a temperature and a sliding speed of a plastic material, the load per unit area is changed by dimensional accuracies of the leg portion of the clip and the hole of the receiving member, the area is changed by a fastening margin (fitting depth), and the resisting force is significantly changed by these elements. Further, when the resisting force is large, there

is a case of buckling the leg portion of the clip made of plastic having a strength weaker than that of a metal.

Therefore, the high dimensional accuracies are needed in order to prevent the buckling such that the resisting force 5 does not become excessively large. Further, in order to alleviate a press-fitting resistance in fitting, the fastening margin also needed to be set to be small, and a reduction in fastening margin brings about a reduction in the binding force.

Further, in order to restrict the fastening margin to some 10 degree, it is also necessary to prepare clips of a plurality of kinds of dimensions in accordance with a condition of a size of a bag to complicate handling thereof or increase cost of a consumable product.

15 Disclosure of the Invention

It is an object of the invention to provide a binding piece connecting body comprising a single connecting body and a binding apparatus capable of binding a bag opening portion by only charging the single connecting body.

20 Further, it is an object of the invention to provide a binding piece resolving a concern of buckling a clip by reducing a fitting load without reducing a binding force.

In order to achieve the above-described object, a binding piece according to a first aspect of the invention is a binding 25 piece connecting body connected with a plurality of binding

pieces each comprising a clip having a pair of leg portions and a receiving member having a pair of holes for pinching to bind a bag opening portion by the receiving member and the clip by press-fitting the pair of leg portions of the clip 5 to the pair of holes of the receiving member, wherein the binding piece is constituted by providing the receiving member to the clip and the plurality of binding pieces are connected.

Further, a connecting portion for connecting the binding piece and other binding piece may be formed in a taper shape 10 such that one end of the connecting portion becomes slenderer than other end thereof.

Further, a projected portion may be provided at either one of a face of the clip for pinching the bag opening portion and a face of the receiving member for pinching the bag opening 15 portion.

Further, a binding piece according to a second aspect of the invention is a two-pieces-type binding piece comprising a clip and a receiving member provided in correspondence with a pair of leg portions of the clip and including two holes 20 respectively fitted respectively to the pair of leg portions, wherein a lubricant is coated to a hole wall of the receiving member or peripheral faces of the pair of leg portions of the clip, or both thereof.

Further, the lubricant may be coated to front portions

of the pair of leg portions of the clip, or a vicinity of an opening edge of the hole wall of the receiving member on a side of fitting the pair of leg portions.

Further, a binding piece connecting body may be constituted
5 by constituting a unit binding piece in which the clip and the receiving member are provided in parallel and connected to each other and connecting a plurality of the unit binding pieces.

Further, a connecting portion for connecting the plurality
10 of unit binding pieces each other may be formed in a taper shape such that one end side thereof becomes slenderer than other end side thereof.

Further, the clip and the receiving member may be operated to cooperatively to pinch an opening portion or a neck portion
15 of the bag member, and a projected portion may be formed at either one of a face of the clip for pinching the bag member and a face of the receiving member for pinching the bag member.

Further, a binding apparatus according to a third aspect of the invention a binding apparatus for binding a bag opening portion of a bag at standby at a binding portion by press-fitting a pair of leg portions of a clip to a pair of holes of a receiving member, the binding apparatus comprises a driver for cutting to separate a front binding piece of the binding piece connecting body and cutting to separate the clip of the binding piece

from the receiving member, and feeding means for feeding the receiving member cut to be separated from the clip to the binding portion, wherein after feeding the receiving member to the binding portion by the feeding means, the driver feeds the 5 clip to the binding portion and binds the bag opening portion by press-fitting the pair of leg portions of the clip to the pair of holes of the receiving member fed to the binding portion.

Further, the feeding means may comprise a guide wind path for guiding the receiving member cut to be separated from the 10 clip to the binding portion and wind blowing means for feeding the receiving member to the binding portion by blowing air to the guide wind path.

Further, an inner side face of the guide wind path may be provided with a guide groove for guiding air blown from 15 a blow out port of the wind blowing means from the blow out port along the guide wind path.

Further, a wall of a portion at which a moving path for moving the clip to the binding portion and the guide wind path join may be pivoted in a direction of expanding the guide wind 20 path.

Further, a holding member arranged at the binding portion and holding the receiving member may be provided, a stopper impacted to the receiving member fed from the guide wind path for stopping the receiving member may be provided at the holding

member, and a face for impacting the receiving member of the stopper may be inclined.

Further, the clip may comprise a base portion provided with the pair of leg portions and a groove provided along a rear face of the base portion constituting a side opposed to the leg portion, a front end portion of the driver may be provided with an inserting portion inserted into the groove, and a clip main body may be fed to the binding portion by inserting the inserting portion into the groove.

Further, a depth of the groove may be deepened on both end sides of the base portion, and the inserting portion may be formed substantially in a U-like shape.

Brief description of the drawings:

Fig.1 is a plane view showing a binding piece connecting body according to Embodiment 1.

Fig.2 is a side view of the binding piece connecting body shown in Fig.1.

Fig.3 is a front view showing a binding piece of the binding piece connecting body of Fig.1.

Fig.4 is a sectional view showing the binding piece of Fig.3.

Fig.5 is an explanatory view showing a state of press-fitting a leg portion of a clip to a hole of a receiving member.

Fig.6 is a sectional view of Fig.5.

Fig.7 is a vertical sectional view showing a constitution of a binding apparatus according to the invention.

Fig.8 is a plane view showing the binding apparatus of
5 Fig.7.

Fig.9 is a partially enlarged view showing a portion of the binding apparatus shown in Fig.8.

Fig.10 is an explanatory view conceptually showing a portion of the binding apparatus shown in Fig.7.

10 Fig.11 is an explanatory view showing a separating portion of the binding apparatus shown in Fig.8.

Fig.12 is an explanatory view showing a driver and a clip.

Fig.13 is a side view showing the driver and the clip.

15 Fig.14 is an explanatory view showing a state in which a front end portion of the driver enters a groove of the clip.

Fig.15 is a side view showing the state in which the front end portion of the driver enters the groove of the clip.

Fig.16 is a plane view showing a guide wind path.

20 Fig.17 is a sectional view showing the guide wind path and a guide groove.

Fig.18 is a plane view showing a holding member.

Fig.19 is a side view showing the holding member of Fig.18.

Fig.20 is a front view showing the holding member of Fig.18.

Fig.21 is a sectional view showing a constitution of the

holding member.

Fig.22 is a bottom view showing a block member of the holding member shown in Fig.21.

Fig.23 is a plane view showing a pivoting plate 155 of the holding member shown in Fig.21.

Fig.24 is a partially enlarged view of the binding apparatus shown in Fig.7.

Fig.25 is an explanatory view showing a state of taking out a bound bag.

Fig.26 is an explanatory view showing a periphery of a binding portion of the binding apparatus.

Fig.27 is an explanatory view showing a state of taking out a bound binding piece.

Fig.28 is an explanatory view showing operation of a detecting mechanism and a pressing mechanism when a bag opening portion is inserted into a binding portion.

Fig.29 is an explanatory view showing a state of pressing a bag opening portion.

Fig.30 is an explanatory view showing a receiving member held by a holding member.

Fig.31 is an explanatory view showing immediately before press-fitting a leg portion of a clip to a hole of the receiving member.

Fig.32 is an explanatory view showing a state of

press-fitting the leg portion of the clip to the hole of the receiving member.

Fig.33 is a perspective view of a binding piece connecting body according to Embodiment 2.

5 Fig.34 is a bottom view of the binding piece connecting body according to Embodiment 2.

Fig.35 (a) is a front view of a binding piece.

Fig.35 (b) is a front sectional view of the binding piece.

Fig.36 is a side view of a binding apparatus.

10 Fig.37 is a plane view of a front portion of a binding apparatus.

Fig.38 (a) is a sectional view showing a procedure of fitting a clip and a receiving member.

15 Fig.38 (b) is a sectional view showing the procedure of fitting the clip and the receiving member.

Fig.38 (c) is a sectional view showing the procedure of fitting the clip and the receiving member.

Fig.39 is a perspective view showing a state of fitting the clip and the receiving member.

20 Further, innotations of the drawings, numeral 10 designates a binding piece connecting body, numeral 11 designates a clip, numeral 20 designates a receiving member, numeral 21 designates a hole, numeral 30 designates a binding piece, numeral 1001 designates a binding piece connecting body, numeral 1002 designates a two-pieces-type binding piece, numeral 1003

designates a clip, notation 1003a designates a leg portion, numeral 1004 designates a receiving member, notation 1004a designates a hole, notation 1004b designates a projected portion, numerals 1005 and 1006 designate connecting portions, numeral 5 1011 designates a binding machine, numeral 1012 designates a stand, numeral 1013 designates a pneumatic cylinder, numeral 1014 designates a driver, numeral 1015 designates a reel, numeral 1016 designates a vertical guide, numeral 1017 designates a clip guide way, numeral 1018 designates a receiving member 10 guide way, numeral 1019 designates an air valve, numeral 1020 designates a bag introducing groove, numeral 1021 designates a gate lever, and numeral 1022 designates an on/off valve.

Best Mode for Carrying Out the Invention:

15 Embodiments of a binding piece and a binding apparatus according to the invention will be described with reference to the accompanying drawings.

[Embodiment 1]

<Binding piece connecting body> As shown by Fig.1 through 20 Fig.4, the binding piece connecting body 10 is constituted by connecting a plurality of the binding pieces 30 each constituted by the clip 11 made of a resin having a pair of leg portions 11A, 11A, and the receiving member 20 made of a resin having a pair of holes 21, 21. The clip 11 and the 25 receiving member 20 constituting each binding piece 30 are

integrally molded into a single member. Further, a plurality of the binding pieces 30 are integrally molded into a single member to form the integral binding piece connecting body 10 made of a resin.

5 The clip 11 includes a base portion 11B integrally and continuously formed with the pair of leg portions 11A, 11A and is formed substantially in a U-like shape by the leg portions 11A, 11A and the base portion 11B. Further, a rear face (upper face in Fig. 2 through Fig. 4) of the base portion 11B constituting 10 a side opposed to the leg portions 11A, 11A is formed with a groove 12 along a longitudinal direction of the base portion 11B. A depth of the groove 12 is deepened on both end sides of the base portion 11B and a projected portion 13 in a trapezoidal shape is formed at inside of the groove 12.

15 Further, a connecting portion 14 is formed at a side face 11Ba of the base portion 11B of the clip 11, and the base portion 11B is connected to the base portion 11B of other clip 11 by way of the connecting portion 14. As shown by Fig. 1, the connecting portion 14 is formed in a trapezoidal shape, and 20 a width thereof is reduced gradually to the clip 11 on a front head side.

 A connecting portion 15 is formed at a lower portion of one end face 11Bb of the base portion 11B of the clip 11, and the receiving member 20 is connected to the clip 11 by way

of the connecting portion 15. As shown by Fig.3 and Fig.4, a thickness of the connecting portion 15 is thinned gradually as proceeding to the left and to the receiving member 20, mentioned later.

5 The receiving member 20 is formed substantially in a shape of a parallepiped and two upper and lower end portions (in Fig.1) are formed in a shape of a circular arc and penetrated with a pair of the holes 21, 21 to be press-fitted with the leg portions 11A, 11A of the clip 11 in an up and down direction
10 (in Fig.3 and Fig.4). Further, a projected portion 22 projected to a lower side is provided between the holes 21, 21 at a lower face 20a of the receiving member 20, and a recessed portion 23 is formed between the holes 21, 21 of an upper face 20b of the receiving member 20.

15 Further, as shown by Fig.5 and Fig.6, by press-fitting the leg portions 11A, 11A of the clip 11 to the holes 21, 21 of the receiving member 20, a bag opening portion is pinched to bind between the base portion 11B of the clip 11 and the receiving member 20.

20 As described above, the binding piece connecting body 10 is constituted by connecting the binding piece 30 provided with the receiving member 20 to the clip 11 and therefore, the binding piece connecting body 10 is a single connecting body and therefore, the single connecting body may be controlled.

<Binding apparatus> Fig.7 through Fig.9 show a binding apparatus 100 for binding the bag opening portion by the binding piece 30.

5 The binding apparatus 100 includes an apparatus main body 103 supported by an upper portion of a stay 102 provided at a base 101. An upper portion of the apparatus main body 103 is provided with a cartridge 104 wound with the binding piece connecting body 10.

10 The apparatus main body 103 is provided with a binding portion 105 for binding the bag opening portion, an inserting path 106 for inserting the bag opening portion to the binding portion 105, a moving path 107 in a linear shape for moving the clip 11 to the binding portion 105, a separating portion 15 108 provided at a rear portion (on a side opposed to the binding portion 105) of the moving path 107 and a supply port 109 for supplying the binding piece 30 to the separating portion 108.

The supply port 109 is provided at a ceiling plate 103A covering the moving path 107.

20 The separating portion 108 is provided with a wall portion K1 (refer to Fig.11) for restricting the receiving member 20 from moving to a front side (left side in Fig.9).

Further, the apparatus main body 103 is provided with a supplying mechanism 120 for supplying a front head one of

the binding piece 30 of the binding piece connecting body 10 from the supply port 109 to the separating portion 108, a driver 110 for extruding the clip 11 to a front side by cutting to separate the front head binding piece 30 fed to the separating portion 108 and cutting to separate the clip 11 and the receiving member 20, a driver driving portion 130 for reciprocally moving the driver 110 in a front and rear direction, a feeding mechanism (feeding means) 140 for feeding the receiving member 20 cut to be separated from the clip 11 to the binding portion 105, a holding member 150 for holding the receiving member 20 fed to the binding portion 105 by the feeding mechanism 140, a detecting mechanism 160 for detecting the bag opening portion inserted to the binding portion 105, a pressing mechanism for pressing the bag opening portion inserted into the binding portion 105 and the like.

Further, a front portion of the apparatus main body 103 is provided with a pivoting base plate 180 for partitioning to form the inserting path 106. Further, a front side (right side of Fig.26) of the holding member 150 is provided with a wall block 200 forming a portion of the moving path 107.

<Supplying mechanism> As shown by Fig.10 and Fig.11, the supplying mechanism 120 includes a guide member 121 erected at the ceiling plate 103A and guiding the binding piece connecting

body 10 to the supply port 109, a feed claw (not illustrated) for feeding the binding piece connecting body 10 mounted to the guide member 121 to the supply port 109, driving means 122 (refer to Fig.7) for moving the feed claw in an up and 5 down direction, an inverse stop claw (not illustrated) for preventing the binding piece connecting body 10 mounted to the guide member 121 from moving up and the like.

The guide member 121 is mounted with the binding piece connecting body 10 such that the leg portions 11A, 11A of the 10 clip 11 of the binding piece connecting body 10 pinch the guide member 121, and the binding piece connecting body 10 is made to be able to move down along the guide member 121.

The driving means 122 includes an air cylinder, not illustrated, a piston (not illustrated) provided to be able 15 to move up and down at inside of the air cylinder, and a piston rod (not illustrated) connected to the piston. The piston rod is connected to the feed claw, and the feed claw moves up and down by moving the piston rod up and down.

Further, by moving down the feed claw by moving down the 20 piston rod, the binding piece connecting body 10 mounted to the guide member 121 is moved down to the supply port 109 while being guided by the guide member 121 to thereby supply the binding piece 30 to the separating portion 108. A distance of moving down is set to be substantially equal to a thickness

of one piece of the binding piece 30.

When the piston rod is moved down by the predetermined distance, the piston rod is stopped to move down and thereafter moved up to an original position. Although the feed claw is 5 moved up to the original position by moving up the piston rod, at this occasion, the binding piece connecting body 10 is prevented from being moved up along with the feed claw by the inverse stop claw.

10 <Driver> As shown by Fig.12 and Fig.13, the driver 110 includes a front end portion (inserting portion) 111 a thickness of which is formed to be thin. As shown by Fig.12, both ends of the front end portion 111 include projected portions 111A, 111A and a shape of the front end portion 111 is formed to 15 be substantially the same as the shape of the projected portion 13 of the clip 11.

Further, as shown by Fig.14 and Fig.15, by advancing the driver 110 and inserting the front end portion 111 into the groove 12 of the clip 11 and advancing to move (move to left 20 side of Fig.14), the clip 11 is cut to be separated from the receiving member 20 and cut to be separated from the binding piece connecting body 10 (other clip 11).

<Driver driving portion> As shown by Fig.7 and Fig.8,

the driver driving portion 130 includes an air cylinder 131, a piston 132 provided movably in the front and rear direction at inside of the air cylinder 131, and a piston rod 133 connected to the piston 132. A front end portion of the piston rod 133 5 is connected with a rear portion of the driver 110.

Further, the driver 110 is advanced by advancing the piston rod 133 along with the piston 132. The clip 11 is cut to be separated from the binding piece connecting body 10 by advancing the driver 110, the separated clip 11 is moved to the binding 10 portion 105 by passing the moving path 107, and the leg portions 11A, 11A of the clip 11 are press-fitted to the holes 21, 21 of the receiving member 20 disposed at a binding position to thereby bind the bag.

15 <Feeding mechanism> As shown by Fig.9, the feeding mechanism 140 includes a guide wind path 141 branched from the separating portion 108 of the moving path 107 and extended to the holding member 150 provided at the binding portion 105, blowing means 142 for feeding the receiving member 20 cut to 20 be separated from the clip 11 to the binding portion 105 by blowing air to the guide wind path 141 and the like.

As shown by Fig.16, the blowing means 142 includes a blow out port 143 provided at an inner wall K2 of the guide wind path 141 opposed to the wall portion K1 of the separating portion

108 and a guide groove 144 formed along the guide wind path 141 from the blow out port 143, having a predetermined length and having a predetermined sectional area as shown by Fig.17.

5 The blow out port 143 is communicated with a tank, not illustrated, filled with compressed air by way of an air valve 145 (refer to Fig.8).

Further, the receiving member 20 is fed to the binding portion 105 by blowing air from the blow out port 143.

10 <Holding member> As shown by Fig.18 through Fig.21, the holding member 150 includes a block member 151, and a pivoting plate 155 pivotably provided to a shaft 151J provided at a rear portion of the block member 151, and an opening 150A is formed at a front face thereof by the block member 151 and 15 the pivoting plate 155.

20 <Block member> The block member 151 includes a base portion 151A formed by a thick wall, and a thin-walled upper wall portion 153 projected from an upper portion of a front face 152 of the base portion 151A to a front side (right side of Fig.21).

Further, the front face 152 of the base portion 151A constitutes a guide face for guiding the receiving member 20. Further, an end portion side (lower portion of Fig.22) 152a of the front face 152 is inclined to constitute an inclined face. The inclined

face 152a is inclined such that a distance from a front end of the upper wall portion 153 to the inclined face 152a is increased as proceeding to a lower end (of Fig.22).

Further, as shown by Fig.18 and Fig.22, the front face 5 152 of the block member 151 is provided with holes 154, 154 for escaping the leg portions 11A of the clip 11 in binding the binding piece 30.

A front end of the upper wall portion 153 is formed with a projected streak portion 153a projected to a lower side along 10 a front end thereof, and the projected streak portion 153a guides the receiving member 20. Further, one end (left end of Fig.20) of a lower face of the upper wall portion 153 is formed with a stopper 153S projected to a lower side for stopping the receiving member 20, and the stopper 153S is formed with 15 an inclined face 153Sa inclined to a skewed lower side.

Further, a distance from the front face 152 of the base portion 151A of the block member 151 to the projected streak portion 153a of the upper wall portion 153 is set to be substantially equal to a height H (refer to Fig.4) of the receiving 20 member 20.

Further, an opening of a right side face (in Fig.20) of the holding member 150 constitutes an introducing port 150H for introducing the receiving member 20.

<Pivoting plate> As shown by Fig.23, the pivoting plate 155 includes a flat plate portion 156 for mounting the receiving member 20, and arm portions 157A, 157B projected from both end portions (upper and lower ends of Fig.23) of the flat plate portion 156 to a left side. As shown by Fig.19, the arm portions 157A, 157B are provided with bearing portions 159A, 159B in a circular shape axially supported pivotably by the shaft 151J of the block member 151.

The bearing portion 159B is formed with a projection 159Ba disposed on a left side (in Fig.23) of the shaft 151J and projected to an upper side, the projection 159Ba is urged to a lower side by a spring S1 provided at the apparatus main body 103, the pivoting plate 155 is urged in the counterclockwise direction (in Fig.19) around the shaft 151J and is disposed at a position indicated by bold lines of Fig.19 and Fig.20.

Further, a front end of the flat plate portion 156 of the pivoting plate 155 is formed with a projected streak portion 156a projected to an upper side along a front end thereof. The projected streak portion 156a guides the receiving member 20.

Further, as shown by Fig.19 and Fig.20, when the pivoting plate 155 is closed, a distance from the front face 152 of the base portion 151A of the block member 151 to the projected streak portion 156a of the flat plate portion 156 of the pivoting

plate 155 is set to be substantially equal to the height H (refer to Fig.4) of the receiving member 20. Further, a height from the upper face 156S of the flat plate portion 156 of the pivoting plate 155 to the lower face 153S of the upper wall portion 153 of the block member 151 is set to be substantially equal to a thickness W (refer to Fig.21) of the receiving member 20.

10 <Pivoting base plate> As shown by Fig.24, the pivoting base plate 180 is brought into contact with a lower side of the pivoting plate 155 of the holding member 150 and is urged in the counterclockwise direction (in Fig.24) by a spring S2 centering on a shaft 181 provided at a front portion of the apparatus main body 103.

15 Further, as shown by Fig.25, when the bag 200 bound by the binding piece 30 is pulled to a lower side, the pivoting plate 155 and the pivoting base plate 180 are pivoted in the clockwise direction centering on the shafts 151J, 181 against urging forces of the springs S1, S2. By the pivoting, as shown 20 by Fig.25, front sides of the inserting path 106 and the holding member 150 are opened and the bound bag 300 is facilitated to remove from the binding portion 105.

<Wall block> As shown by Fig.26, the wall block 200 is

provided to pivot around a shaft 201, urged in the clockwise direction by a spring S3 and is restricted by a stopper T so as not be pivoted in the clockwise direction from a position indicated by a bold line of Fig.26.

5 Further, a left side face 200A of the wall block 200 covers about a half of the opening 150A of the holding member 150.

Further, the wall block 200 forms a wall at a portion at which the moving path 107 for moving the clip 11 to the binding portion 105 and the guide wind path 141 of the feeding mechanism 140
10 for feeding the receiving member 20 to the binding portion 105 join.

Further, when the wall block 200 is pivoted in the counterclockwise direction against an urging force of the spring S3 as shown by Fig.27 by pulling the bag 200 bound by the binding piece 30, the opening 150A of the holding member 150 covered by the left side face 200A of the wall block 200 is opened to be brought into a state of expanding to open the guide wind path 141 of the portion of joining with the moving path 107.
15

20 <Detecting mechanism> As shown by Fig.9, the detecting mechanism 160 includes a detecting member 161 pivotably supported axially by a shaft 160J provided at a front portion of the apparatus main body 103, and an air valve 162 for detecting that the detecting member 161 is pivoted.

The detecting member 161 covers portions of the binding portion 105 and the inserting path 106, and when the bag opening portion is inserted from the inserting portion 106 and inserted into the binding portion 105, the detecting member 161 is pivoted 5 in the clockwise direction to depress a button 162A of the air valve 162. The air valve 162 is constituted to be opened when the button 162A is depressed.

<Pressing mechanism> As shown by Fig.8 and Fig.9, the 10 pressing mechanism 170 includes a pressing member 172 pivotably supported axially by a shaft 171 provided at the apparatus main body 103 and a press driving portion 173 for pivoting the pressing member 172.

The pressing member 172 includes a path forming portion 15 173 (refer to Fig.28) having a section in a channel-like shape forming a portion of the moving path 107, a bearing portion 174 axially supported by the shaft 171, a connecting portion 175 connected to the driving portion 173, and the path forming portion 173 and the bearing portion 174 and the connecting portion 20 175 are disposed at positions in correspondence with respective apexes of a triangle.

As shown by Fig.8, the driving portion 173 includes an air cylinder 176, a piston 177 provided movably in the front and rear direction at inside of the air cylinder 176, and a

piston rod 178 connected to the piston 177. The connecting portion 175 of the pressing member 172 is axially supported by a front end portion of the piston rod 178.

Further, when the pressing member 172 is pivoted in the 5 clockwise direction as shown by Fig.28 centering on the shaft 171 by advancing the piston rod 178 along with the piston 177, as shown by Fig.29, the path forming portion 173 forms a portion of the moving path 107, and a bag opening portion 300A of the bag 300 inserted into the binding portion 105 is pressed.

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<Operation> Next, an explanation will be given of operation of the binding apparatus 100 constituted as described above as follows.

First, as shown by Fig.7 and Fig.10, the binding piece 15 connecting body 10 is set to the binding apparatus 100. The binding piece connecting body 10 may be set thereto once since the binding piece connecting body 10 is a single connecting body.

First, the bag opening portion 300A of the bag 300 is 20 inserted into the binding portion 105 from the inserting path 106 shown in Fig.9. When the bag opening portion 300A is inserted into the binding portion 105, the detecting member 161 of the detecting mechanism 160 is pivoted in the clockwise direction to depress the button 162A of the air valve 162. Thereby,

the air valve 162 is opened and the press driving portion 173 of the pressing mechanism 170 is operated.

That is, compressed air is fed to the air cylinder 176 of the press driving portion 173, and the piston 177 and the 5 piston rod 178 are moved to the front side (left side in Fig.8).

By moving the piston rod 178 to the front side, the pressing member 172 is pivoted in the clockwise direction, and is pivoted to a position shown in Fig.28 to stop moving the piston 177 and the piston rod 178 to the front side.

10 When the pressing member 172 is pivoted to the position shown in Fig.28, as shown by Fig.29, the path forming portion 173 of the pressing member 172 forms a portion of the moving path 107 and presses the bag opening portion 300A of the bag 300.

15 Further, the driver driving portion 130 is operated. That is, compressed air is supplied to the air cylinder 131 of the driver driving portion 130, and the driver 110 is advanced by advancing the piston rod 133 along with the piston 132. By advancing the driver 110, as shown by Fig.14 and Fig.15, 20 the front end portion 111 of the driver 110 is inserted into the clip 11 disposed at the separating portion 108 of the moving path 107, that is, the groove 12 of the clip 11 of the front head binding piece 30 of the binding piece connecting body 10.

Further, when the driver 110 is moved to advance further, the clip 11 is cut to be separated from the receiving member 20 and cut to be separated from the binding piece connecting body 10.

5 On the other hand, when the air valve 162 of the detecting mechanism 160 is opened, air is blown out from the blow out port 143 of the feeding mechanism 140 and flows at high speed in an arrow mark direction shown in Fig.11 and Fig.14. Further, the air flows at high speed to the binding portion 105 by passing
10 the guide wind path 144.

The receiving member 20 cut to be separated from the clip 11 is fed to the binding portion 105 along the guide wind path 144 by the high speed flow of air.

Meanwhile, the predetermined length of the guide groove
15 144 is formed from the blow out port 143 along the guide wind path 141 and therefore, despite presence of the receiving member 20, air blown out from the blow out port 143 can firmly be made to flow in the arrow mark direction and therefore, air flowing along a face of the receiving member 20 can be prevented
20 from flowing also in an inverse direction by a Coanda phenomenon, and the receiving member 20 can firmly be fed to the binding portion 105. Further, when the Coanda phenomenon is brought about, the receiving member 20 cannot be fed to the binding portion 105.

The receiving member 20 passes through the guide wind path 144 and is introduced into the holding member 150 from the introducing port 150H of the holding member 150 as shown by Fig.30 impacted to the stopper 153S of the block member 151 and is stopped at a position (binding position) shown in Fig.30. That is, the receiving member 20 is held by the holding member 150.

Meanwhile, since the stopper 153S is formed with an inclined face 153Sa, a force received by the receiving member 20 from the stopper 153S in impacting is directed in an arrow mark Q1 direction directed to a skewed lower side. Therefore, the receiving member 20 can be restrained from jumping back and the receiving member 20 can swiftly be stopped at the binding position.

Thereafter, the clip 11 cut to be separated from the binding piece connecting body 10 and the receiving member 20 by the driver 110 passes through the moving path 107 and is moved to the binding portion 105. The driver 110 feeds the clip 11 to the binding portion 105 while advancing as it is even after cutting to separate the receiving member 20 from the clip 11, since the speed of moving the receiving member 20 through the guide wind path 144 is fast, the receiving member 20 arrives at the binding portion 105 after having been held by the holding member 150.

In moving the receiving member 20, the front end portion 111 of the driver 110 is brought into the groove 12 of the clip 11 to pinch the projected portion 13 and therefore, the clip 11 can be fed to the binding portion 105 in a stable state.

5 Further, as shown by Fig.31 and Fig.32, when the clip 11 is moved to the binding portion 105, the bag opening portion 300A (refer to Fig.20) of the bag 300 is brought to between the leg portions 11A, 11A of the clip 11. Further, when the driver 110 is advanced further, the leg portions 11A, 11A of
10 the clip 11 are press-fitted to the holes 21, 21 of the receiving member 20 to bind the bag opening portion 300A.

In the binding, the projected portion 22 of the receiving member 20 is brought to between the leg portions 11A, 11A of the clip 11 and therefore, a space formed between the receiving member 20 and the base portion 11B of the clip 11 is brought into a flat state. Therefore, the bag opening portion 300A can be brought into a close contact state uniformly and strongly over a total thereof, and even when water is included in the bag 300, water can be prevented from being leaked. Incidentally, 15 when the bag opening portion is bound in a circular shape, the bag opening portion cannot be brought into the close contact state strongly at a center portion thereof and there is a concern 20 of leaking water.

When the binding has been finished, air of the air cylinder

131 is discharged and the driver 110 returns to an original position, and air is stopped from blowing out from the blow out port 143. Further, air of the air cylinder 176 of the press driving portion 173 is discharged and the press member 5 172 returns to the original position shown in Fig.8.

Further, when the bound bag 300 is pulled to a skewed lower side as shown by Fig.25, the pivoting plate 155 and the pivoting base plate 180 are pivoted in the clockwise direction against the urge forces of the springs S1, S2. By pivoting 10 the pivoting plate 155, the clip 11 is facilitated to be removed from the holding member 150, further, by the pulling, as shown by Fig.27, the wall block 200 is pivoted in the counterclockwise direction against the urge force of the spring S3 and therefore, the clip 11 is further facilitated to be removed from the holding 15 member 150.

Further, by pivoting the pivoting base plate 180, the inserting path 106 is brought into an opened state and therefore, the bag 300 is facilitated to be removed from the binding portion 105.

20 On the other hand, when the driver 110 returns to the original position, the supplying mechanism 120 is operated and the binding piece 30 is supplied to the separating portion 108 and operation of the supplying mechanism 120 is stopped.

Further, at each time of inserting the bag opening portion

300A to the inserting path 106 from the binding portion 105, the above-described operation is repeatedly carried out.

Meanwhile, the binding piece connecting body 10 is constituted by the single connecting body and therefore, only 5 one of the supplying mechanism 120 for supplying the binding piece 30 may be provided and therefore, a constitution of the binding apparatus100 is simplified.

[Embodiment 2]

10 Fig.33 shows the binding piece connecting body 1001 which is formed in a belt-like shape far longer than a length shown in the drawing by integrally connecting a number of two-pieces-type binding pieces 1002 each comprising a clip 1003 and the receiving member 1004 made of plastic. Further, 15 Fig.34 is a bottom view of Fig.33. The binding piece connecting body 1001 is connected with the number of binding pieces 1002 for feeding out a continuous binding processing by a binding machine, mentioned later, the clip 1003 includes a pair of left and right circular column type leg portions 1003a, as 20 shown by Fig.34, a number of clips 1003 are connected in series by way of the connecting portions 1005 as connecting portions, and a side face of each clip 1003 is connected in parallel with one receiving member 1004 by way of the connecting portion 1006. The connecting portions 1005 for connecting the number

of binding pieces 1002 to each other are formed in a taper shape such that one end side becomes slenderer than other end side thereof, and when the binding apparatus separates the binding pieces to respective unit binding pieces, the unit 5 binding piece is broken at a minimum width position of the connecting portion to thereby make a shape of the binding piece after having been broken constant. Further, the clip 1003 and the receiving member 1004 constituting each binding piece 1002 are integrally molded into a single member. Further, 10 the plurality of binding pieces 1002 are integrally molded into a single member to form the integral binding piece connecting body 1001 made of a resin.

The receiving member 1004 is formed with the pair of left and right holes 1004a in correspondence with the leg portions 15 1003a of the clip 1003 and is formed with the projected portion 1004b at a center of an upper face thereof in Fig.33. When binding, the receiving member 1004 is cut to be separated from the clip 1003 by the binding machine, fitted to the leg portion 1003a of the clip 1003 in an attitude of making upside down 20 and a bag is brought into a close contact state by pinching a portion of the bag to be bound by the projected portion 1004a.

Fig.35 (a) and Fig.35 (b) show one set of the clip 1003 and the receiving member 1004, the clip 1003 is formed with a groove 1003b for crossing a head portion (a lower horizontal

portion in Fig.35 (a) and Fig.35 (b)) in a left and right direction, the groove 1003b is constituted by a sectional shape of a ridge in which left and right sides thereof are deeper than a center thereof, a recessed shape front end portion of a driver of 5 the binding machine, mentioned later, is engaged with the groove 1003b in the ridge shape to push the clip 1003 and one clip 1003 is cut to be separated from the binding piece connecting body 1001. An inner wall of the hole 1004a of the receiving member 1004 is coated with silicone S as a lubricant from an 10 opening edge of a side (upper side in the drawing) for fitting the circular column type leg portion 1003a to a slightly depth side to facilitate to fit the clip 1003 and the receiving member 1004.

Fig.36 shows the binding machine 1011 using the binding 15 piece connecting body and numeral 1012 designates the stand.

Inside of the binding machine 1011 is provided with the driver 1014 driven by the pneumatic cylinder 1013 and the driver 1014 is moved to the front side and the back side from a rear standby position (right side in Fig.36). The binding piece connecting 20 body 1001 is wound by the reel 1015 and is supported above the binding machine 1011 and is supplied to a front face of the driver 1014 by passing the vertical guide 1016 at a front portion of the binding machine 1011.

Fig.37 is a plane view of the front portion of the binding

machine 1011 which is provided with the curved receiving member guide way 1018 for connecting a front end portion of the clip guide way 1017 in a linear shape through which the driver 1014 and the clip 1003 pass and a portion at which the receiving member 1004 and the binding piece is grounded by passing the vertical guide 1016. The clip guide way 1017 is constituted by a shape of a section through which the one clip 1003 can pass, and the clip 1003 at the front head (lower end) of the of the long binding piece connecting body 1001 supplied from above is pressed by the driver 1014 to be fed to the front side. At this occasion, the front clip 1003 is cut to be separated from the succeeding binding piece connecting body 1001 disposed right thereabove and also the receiving member 1004 connected to a side thereof is cut to be separated from the front clip 1003.

High pressure air is blown to the receiving member guide way 1018 by way of the air valve 1019, and the cut front receiving member 1004 is fed to the front side in the receiving member guide way 1018 by an air flow to reach the front end of the clip guide way 1017. When the receiving member 1004 reaches the front end of the clip guide way 1017, the receiving member 1004 is inverted in the front and rear direction from an original attitude and an upper face (front face) of the receiving member 1004 shown in Fig. 35 is opposed to the leg portion 1003a of

the clip 1003.

When the receiving member 1004 is fed through the receiving member guide way 1018 by the air flow and reaches the front end of the clip guide way 1017, the clip 1003 is pushed by 5 the driver 1014 to advance to the front side at inside of the clip guide way 1017 and is pressed to the receiving member 1004 and the leg portion 1003a is press-fitted to the hole 1004a of the receiving member 1004.

Fig.38 (a), Fig.38 (b), and Fig.38 (c) show a procedure 10 of fitting the clip 1003 and the receiving member 1004, silicone S is coated at a front end portion of an inner wall of the hole 1004a of the receiving member 1004 and therefore, at an initial stage of fitting shown in Fig.38 (b), the leg portion 1003a of the clip 1003 is smoothly fitted into the hole 1004a 15 of the receiving member 1004 by lubricity of silicone S. Further, with progress of fitting, silicone S is expanded and the lubricity is deteriorated, and in a state of finishing to fit shown in Fig.38 (c), a close contact degree of the leg portion 1003a of the clip 1003 and the hole 1004a of the receiving member 20 1004 is promoted, and the clip 1003 and the receiving member 1004 are solidly coupled. Fig.39 shows a state of coupling the clip 1003 and the receiving member 1004.

Further, when an opening of a bag (not illustrated) is narrowed to be inserted into the bag introducing groove 1020

at the front portion shown in Fig.37, the binding machine 1011 is started by opening the on/off valve 1022 by pivoting the gate lever 1021 pushed by the bag, and executes cutting to separate the front clip 1003 and the receiving member 1004 5 as described above, feeding the clip 1003 by the driver 1014, feeding the receiving member 1004 by the air flow and pinches the opening of the bag by the clip 1003 and the receiving member 1004 to be fastened. Although a degree of fitting the clip 1003 and the receiving member 1004 is changed in accordance 10 with a boldness of the bag opening to be bound, by forming the leg portion 1003a of the clip 1003 to be slightly long, a slender bag opening to a bold bag opening can be dealt with, and even when the slender bag opening deepening a depth of fitting the clip 1003 and the receiving member 1004 is bound, 15 stress and load in fitting is reduced by silicone S and therefore, a concern of buckling the leg portion 1003a of the clip 1003 is reduced.

Although an explanation has been given of an example of coating silicone S at a vicinity of the opening end portion 20 of the hole 1004a of the receiving member 1004, the lubricant is not naturally limited to silicone. Further, quite the same operation and effect are achieved even when the lubricant is coated at a vicinity of a front end of the leg portion 1003a of the clip 1003 contrary to the above-described embodiment.

Further, although the lubricant may be coated to both of the clip and the receiving member, the object of the invention can be achieved by coating the lubricant to either one thereof.

Further, although it is conceivable to mold the clip and the receiving member by a plastic material including the lubricant of silicone or the like, the cost is increased, further, there is a concern that the coupling is easy to detach by operating the affluent lubricant to the fitting face after having been fastened, or also the bag opening is made to be easy to be slipped and it is advantageous to partially apply lubricant as in the invention in view of cost and coupling strength.

Further, the invention is not limited to the above-described embodiments but can variously be modified or changed within the technical scope of the invention and it is apparent that the invention covers all modifications and variations.

The invention is based on Japanese Patent Application (P.2004-036502) filed on February 13, 2004 and Japanese Patent Application (P.2004-366527) filed on December 17, 2004, and the contents of which are incorporated herein by reference.

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Industrial Applicability:

According to the invention, the binding piece connecting body comprising the single connecting body can be provided.

Further, the bag opening portion can be bound by only urging

the single connecting body.

Further, according to the invention, by coating the lubricant to the fitting face of the two-pieces-type binding piece comprising the clip and the receiving member, the dynamic friction coefficient is significantly reduced, the clip and the receiving member can be fitted by a lower pressure, and press-fitting can stably be carried out without buckling the clip even under a condition in which a resistance force in fitting is considerably changed by a dimension tolerance, or 5 a surface state, a temperature, a press-fitting speed or the like, and a concern of buckling the clip can be resolved by reducing a fitting load without reducing a binding force. Further, although when a fastening margin is reduced as in a case of binding a bold bag opening, in comparison with a 10 case of not using the lubricant, a fastening force at a press-fitting portion is reduced by an influence of the lubricant, 15 by setting a length of the leg portion and a length of the hole to be long to be able to sufficiently ensure the fastening margin (fitting depth) of the clip and the receiving member, 20 a reduction in the fastening force can be avoided.

Further, by connecting the clip and the receiving member to each other to constitute the integral unit binding piece and connecting the plurality of head binding pieces to constitute the binding piece connecting body, handling and supply to the

binding apparatus are facilitated. Further, the connecting portions for connecting the plurality of the unit binding pieces to each other are formed in the taper shape such that the one end side becomes slenderer than the other end side and therefore, 5 when the binding apparatus separates the binding piece connecting body to the respective unit binding pieces, the unit binding piece is broken at the position of the minimum width of the connecting portion, breaking is facilitated, the unit binding piece is broken at the constant position of the connecting 10 portion and therefore, the shape of the binding piece after having been broken becomes constant.

Further, the projected portion is formed at either one of the face of the clip for pinching the bag member and the face of the receiving member for pinching the bag member and 15 therefore, when the opening portion or the neck portion of the bag member is pinched by cooperatively operating the face of the clip for pinching the bag member and the face of the receiving member for pinching the bag member, the pinched portion of the bag member is solidly pinched and there is not a concern 20 of leaking a content thereof.